

In the claims:

Cancel claims 2-5 without prejudice or disclaimer of the subject matter thereof, amend claim 1, and add new claims 9-10 as follows:

1. (currently amended) In a digital signal receiver for a communication system, a method for processing a multi-dimensional digital signal received from a communication channel, the multidimensional signal including encoded data symbols, each encoded data symbol being represented by a number of sub-symbols in different dimensions of the multi-dimensional signal, the method comprising:

encoding each sub-symbol in the multidimensional signal by extracting sufficient information associated with the sub-symbol for subsequent processing;

performing a pair-swap and symbol alignment operation on the encoded multidimensional signal; and

decoding the pair-swap reordered and symbol aligned multidimensional signal to ~~produce~~ produce data symbols represented by the sub-symbols in an output signal.

2. –5 (cancelled)

6. (currently amended) The digital receiver of claim 10 5, wherein the non-data mode receiver detects pair-swap and symbol misalignment in the multidimensional signal by serially comparing selected bits from each dimension of the non-data part of the multidimensional signal with a set of scrambler coefficients.

7. (currently amended) The digital receiver of claim 10 5, wherein the switchboard module corrects pair-swap and symbol misalignment in the multidimensional signal by performing symbol alignment and pair-swap reordering operations in one pass.

8. (currently amended) The digital receiver of claim 10 5, wherein the switchboard module operates in a verification mode and in a switching mode, verifies that information regarding pair-swap and symbol misalignment detected by the non-data mode receiver is correct in the verification mode, and corrects pair-swap and symbol misalignment in the multidimensional signal in the switching mode.

9. (new) A digital signal receiver for reordering a multi-dimensional signal received from a communication channel, the multidimensional signal including encoded data symbols, each encoded data symbol being represented by a number

of sub-symbols in different dimensions of the multi-dimensional signal, comprising:

    a slicer configured to quantize the sub-symbols in the multidimensional digital signal to a quantized value, wherein each sub-symbol before the slicer is represented by one sign bit, a first and a second magnitude bits and three fractional bits;

    an encoder operating in conjunction with the slicer and configured to encode each sub-symbol to include the quantized value and neighborhood information associated with each sub-symbol by extracting the sign bit, the second magnitude bit, and the three fractional bits to represent the encoded sub-symbol;

    a pair-swap and symbol alignment module coupled to the slicer/encoder and configured to detect and correct pair-swap and symbol misalignment in the multidimensional digital digital; and

    at least one decoder coupled to the pair-swap and symbol alignment module configured to receive the pair-swap reordered and symbol aligned multidimensional signal, to decode the sub-symbols in the multidimensional signal, to correct errors associated with these sub-symbols, and to produce decoded symbols represented by the sub-symbols in an output signal.

10. (new) A digital signal receiver for reordering a multi-dimensional signal received from a communication channel, the multidimensional signal including a data part and a non-data part preceding the data part, and including encoded data symbols, each represented by a number of sub-symbols in different dimensions of the multi-dimensional signal, comprising:

    a slicer configured to quantize the sub-symbols in the multidimensional digital signal to a quantized value;

    an encoder operating in conjunction with the slicer unit and configured to encode each sub-symbol to include the quantized value and neighborhood information associated with the sub-symbol;

    a pair-swap and symbol alignment module coupled to the slicer/encoder and configured to detect and correct pair-swap and symbol misalignment in the multidimensional digital digital, the pair-swap and symbol alignment module including a converter to convert each encoded sub-symbol in the non-data part of the multidimensional signal into binary format and including a non-data mode receiver coupled to the converter to detect pair swap and symbol misalignment in the multidimensional signal using the non-data part of the multidimensional signal in binary form as received from the converter, and including a switchboard module coupled to the non-data mode receiver configured to correct pair-swap and symbol misalignment in the multidimensional signal based on information

regarding pair-swap and symbol misalignment in the multidimensional signal as detected by the non-data mode receiver; and

at least one decoder coupled to the pair-swap and symbol alignment module configured to receive the pair-swap reordered and symbol aligned multidimensional signal, to decode the sub-symbols in the multidimensional signal, to correct errors associated with these sub-symbols, and to produce decoded symbols represented by the sub-symbols in an output signal.